FIG. 1

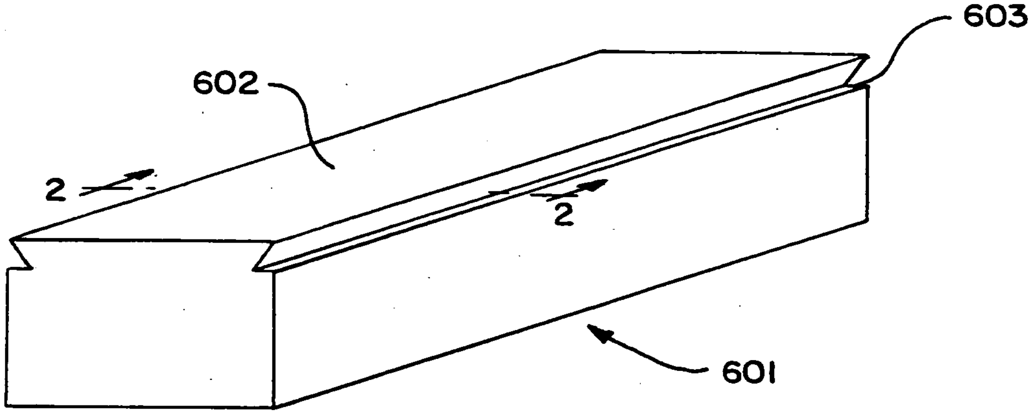


FIG. 2A

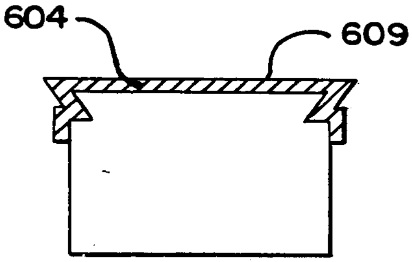


FIG. 2B

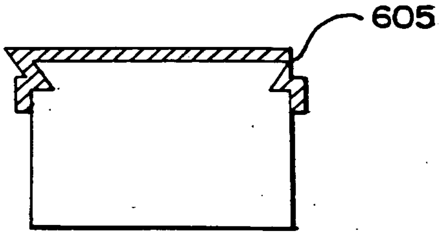


FIG. 2C

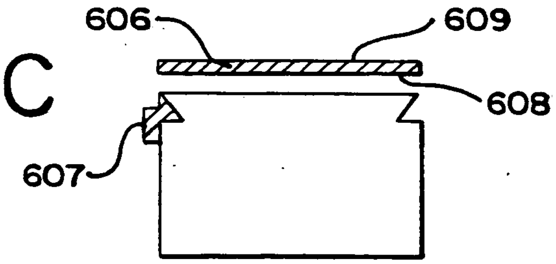


FIG. 3

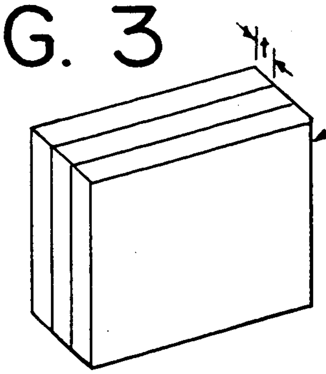


FIG. 3A

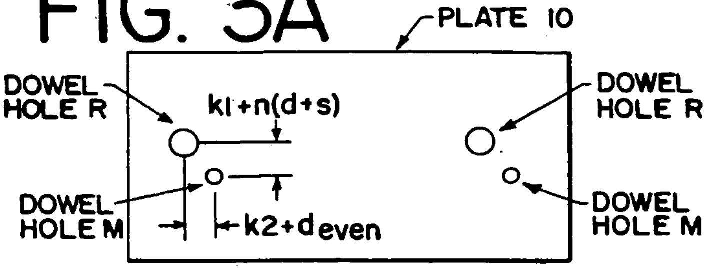


FIG. 4

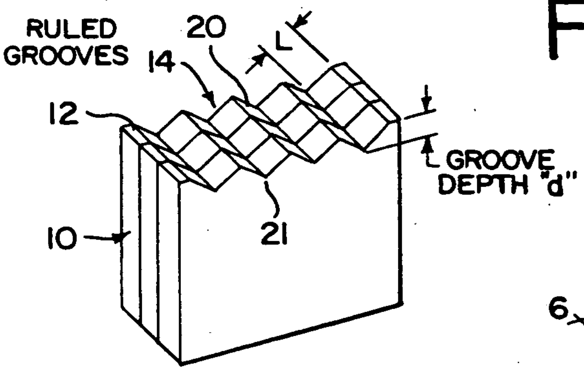


FIG. 5

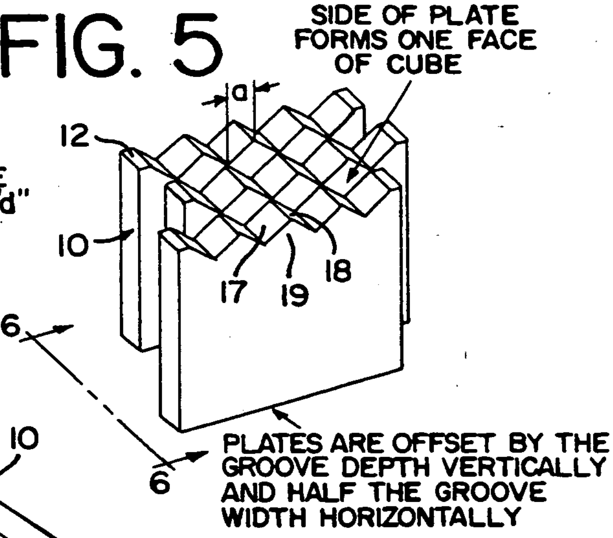


FIG. 6A

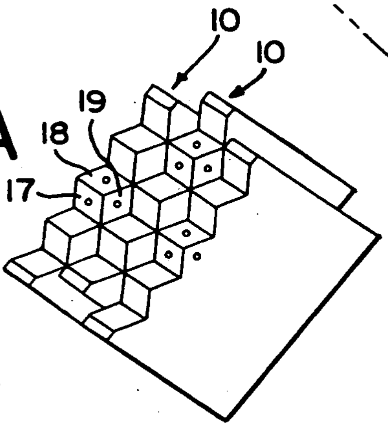


FIG. 6

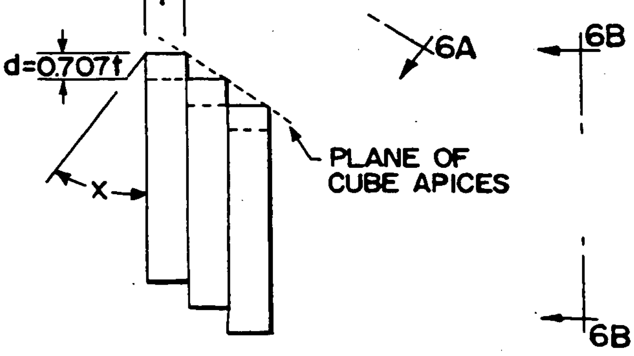


FIG. 6B

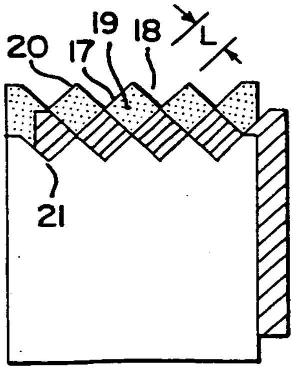


FIG. 7A

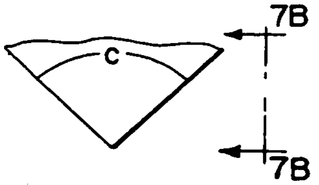


FIG. 7B

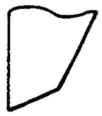


FIG. 9

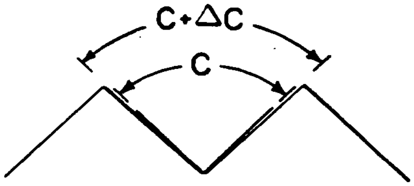


FIG. 8A

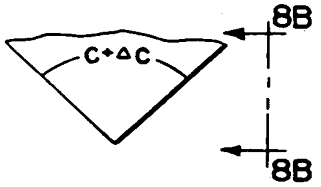


FIG. 8B

TOOL DIRECTION DURING CUTTING

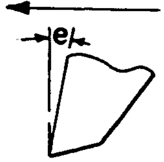


FIG. 10A

PROJECTION ALONG CUBE DIAGONAL

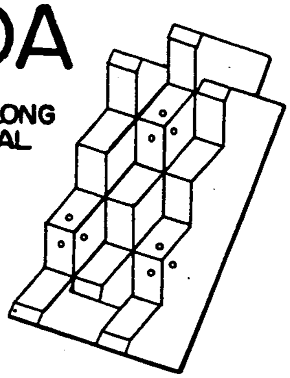


FIG. 10B

PROJECTION PERPENDICULAR TO THE PLANE OF THE CUBE APICES

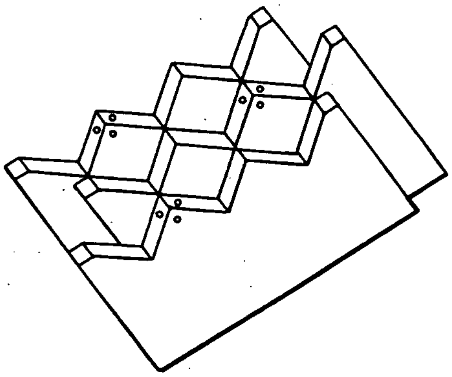


FIG. 10

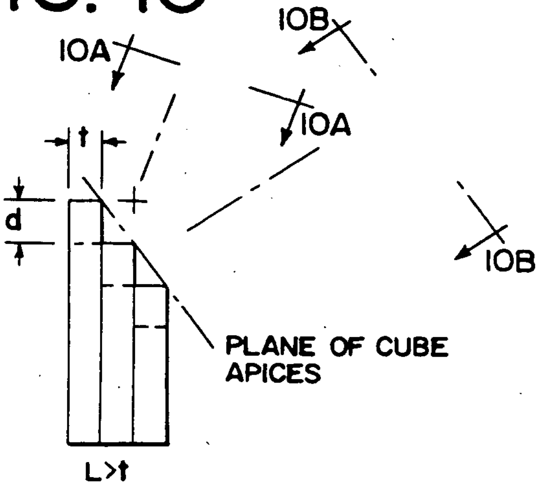


FIG. 10C

PROJECTION PERPENDICULAR TO FACE OF PLATE

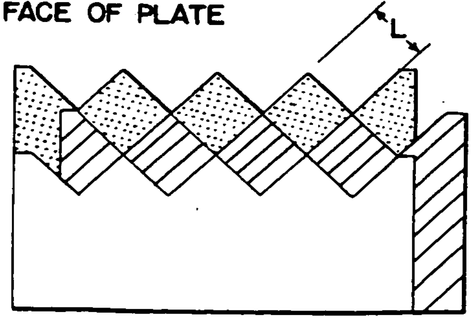


FIG. 11A

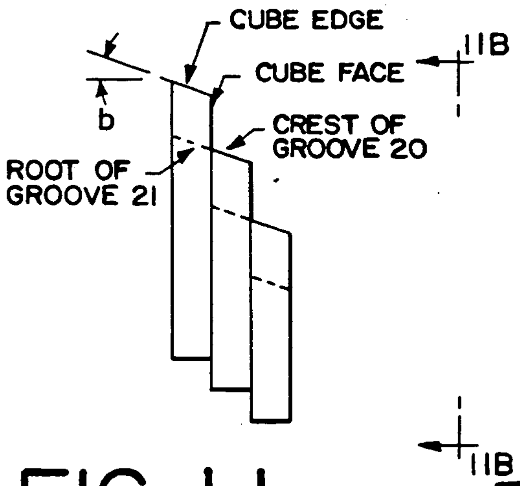


FIG. 11B

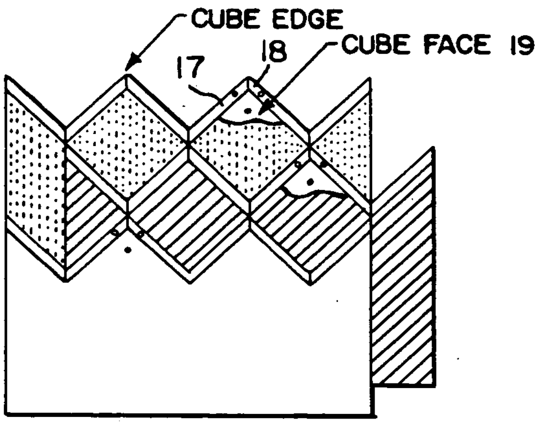


FIG. 11

PLATE ANGLE HIGHLY EXAGGERATED

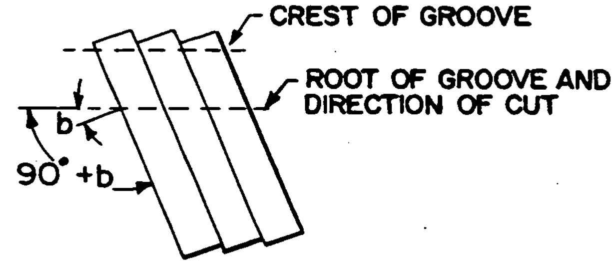
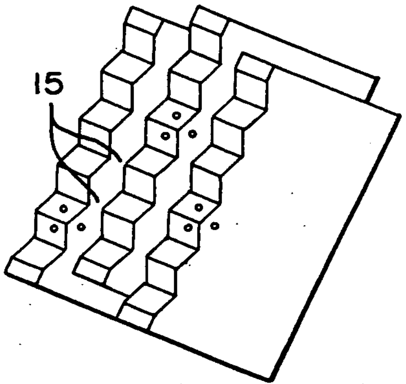


FIG. 12A

PROJECTION ALONG CUBE DIAGONAL



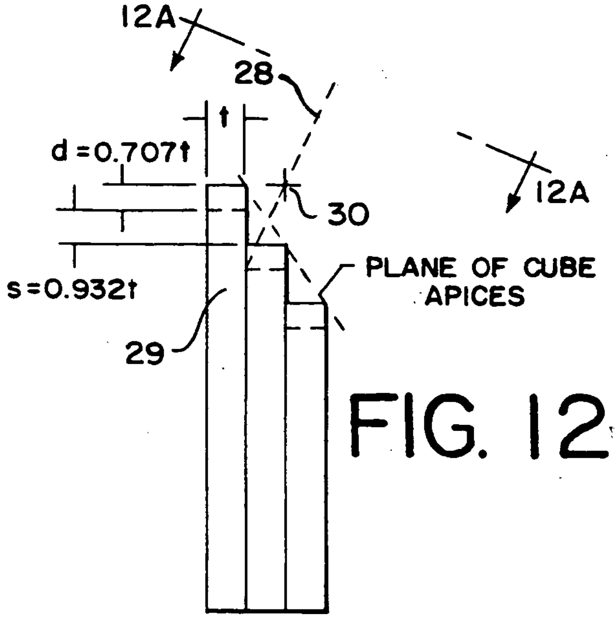
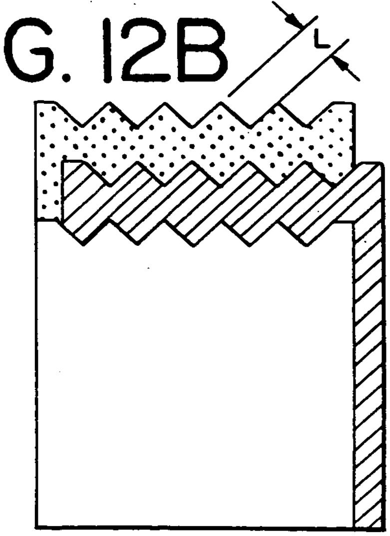


FIG. 12

PLATES DISPLACED SO GROOVE EDGE DOES NOT MEET GROOVE ROOT OF ADJACENT PLATE L=t

FIG. 12B



PROJECTION PERPENDICULAR TO FACE PLATE

FIG. 12C

INTERRELATIONSHIP OF
d, s, t, I AND I'
FOR NEGATIVE VALUES OF I

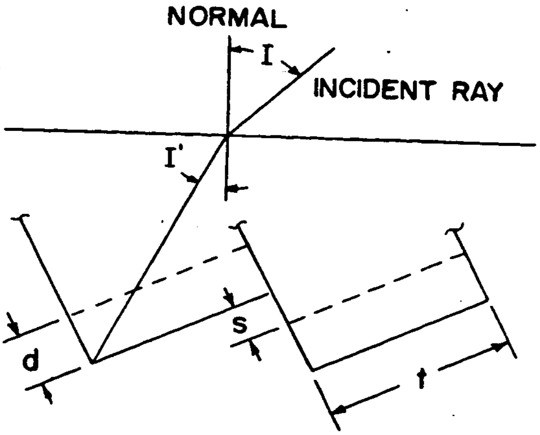


FIG. 12D

INTERRELATIONSHIP OF
d, s, t, I AND I'
FOR POSITIVE VALUES OF I

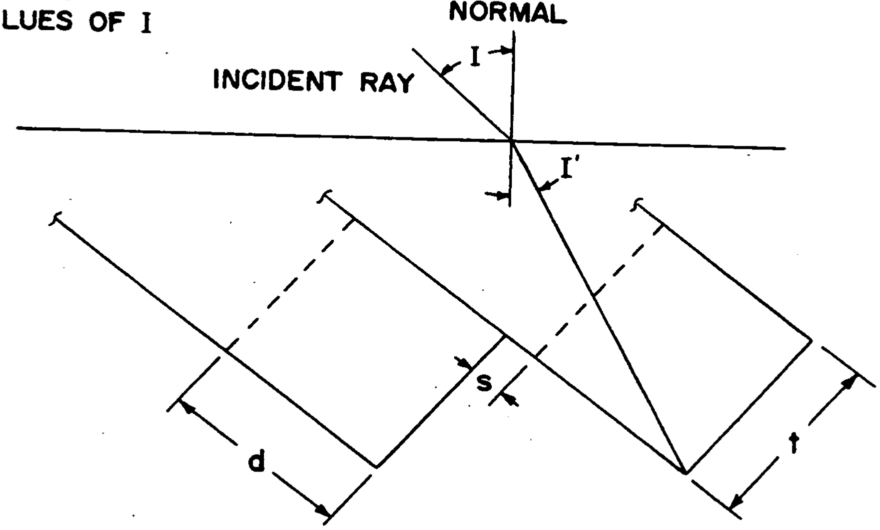
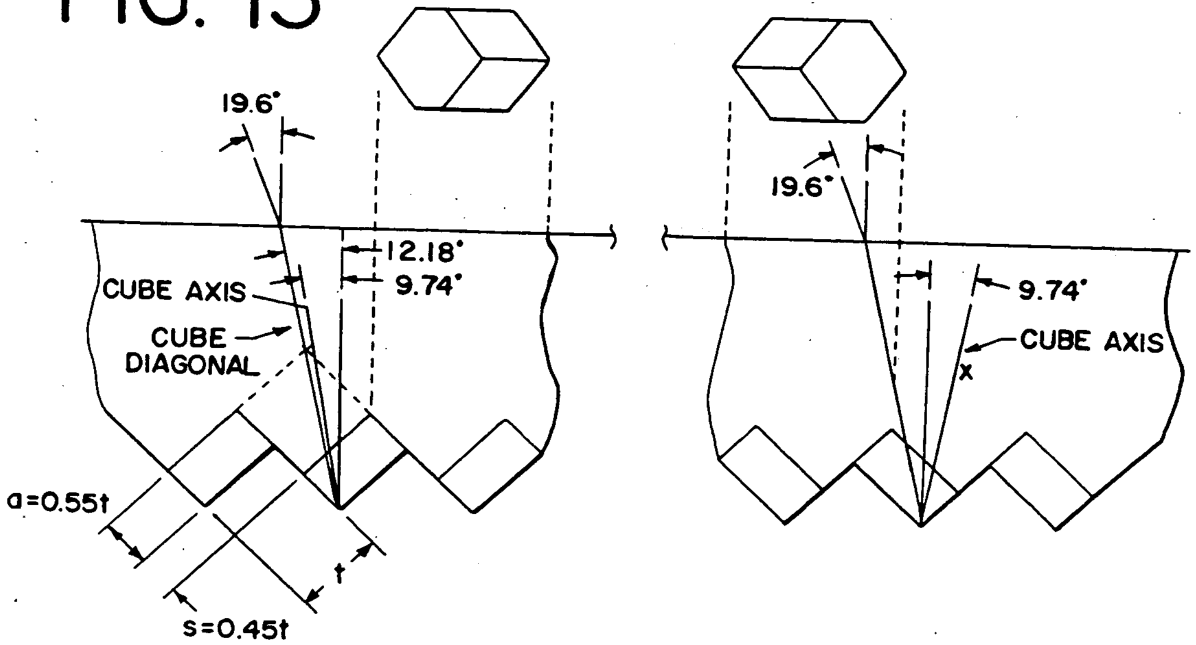


FIG. 13



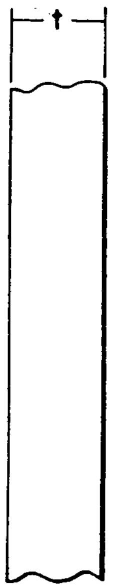


FIG. 14A

FIG. 14B

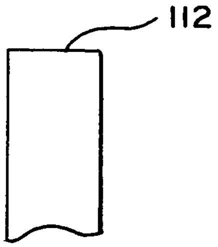
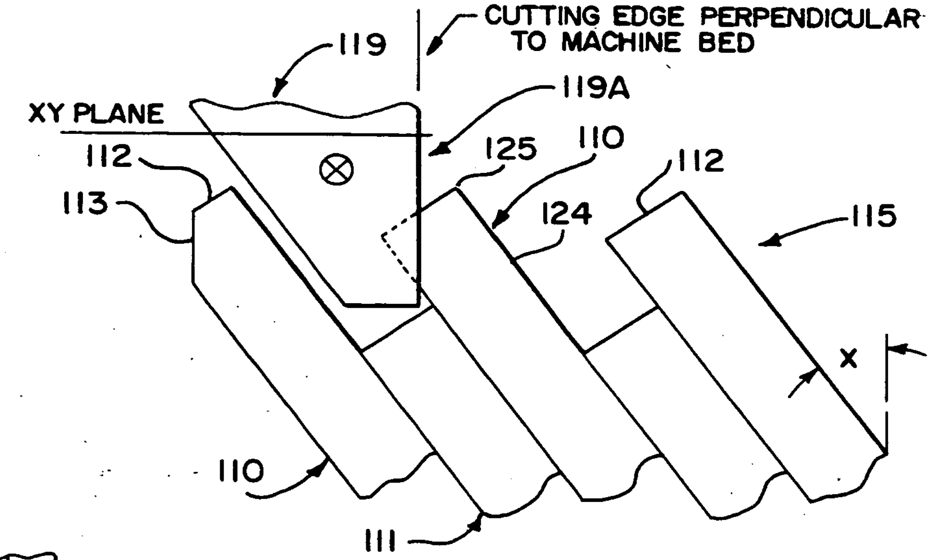


FIG. 15



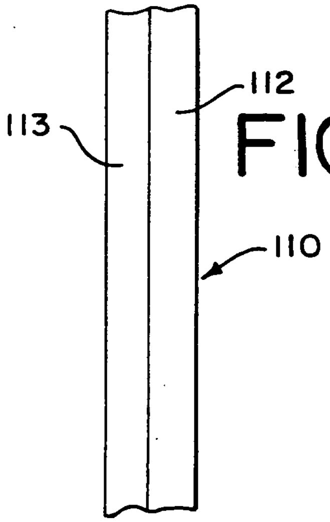


FIG. 16A

FIG. 16B

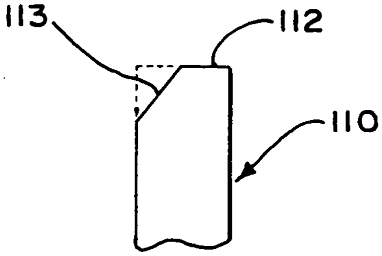
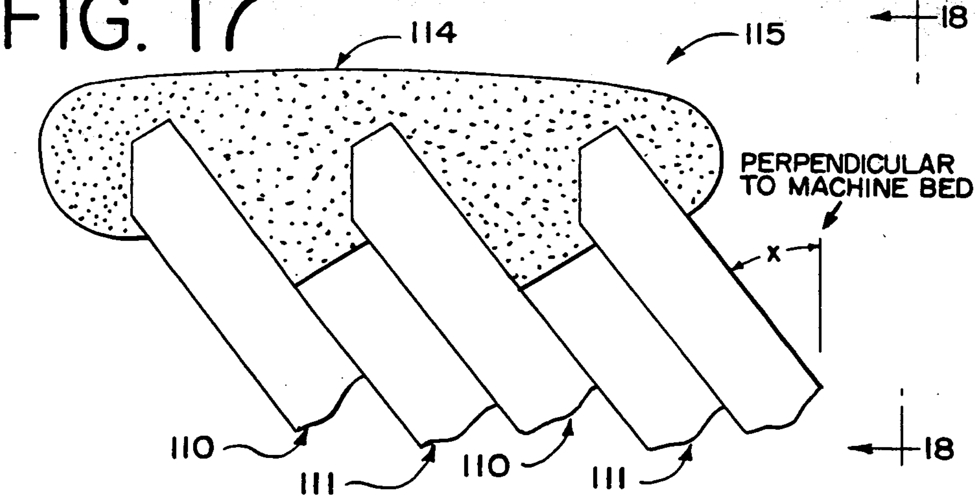


FIG. 17



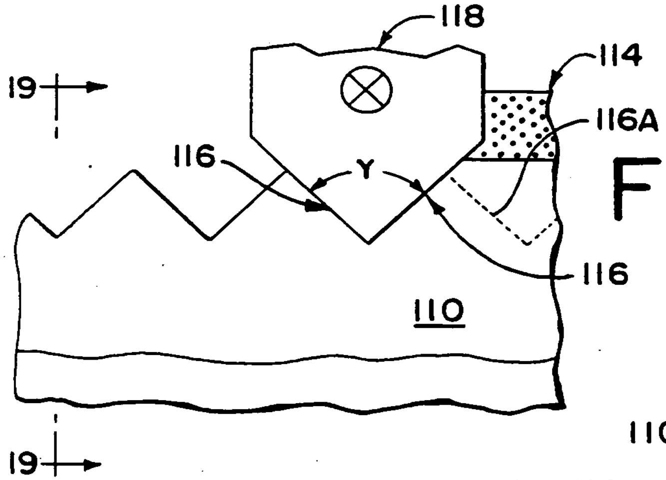


FIG. 18

FIG. 21

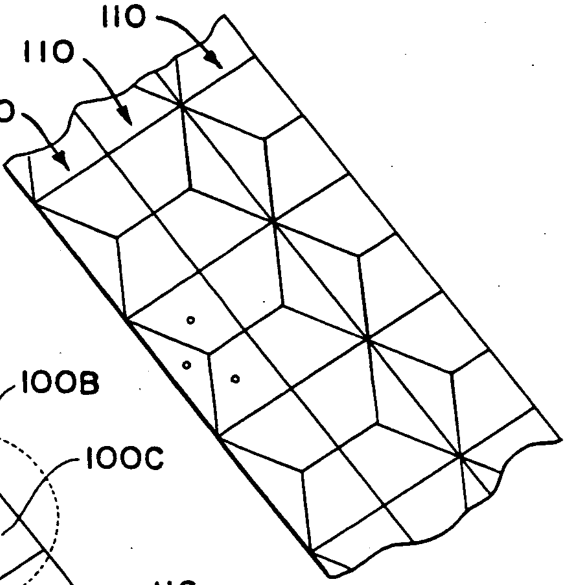


FIG. 20

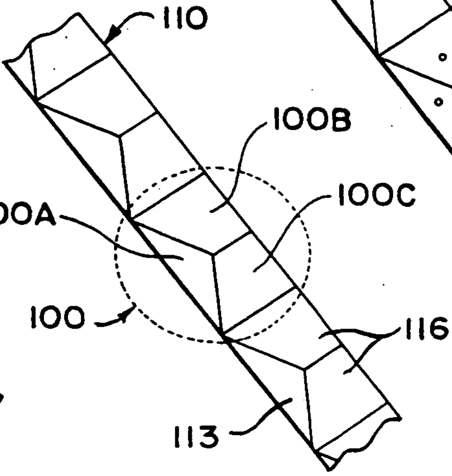


FIG. 19

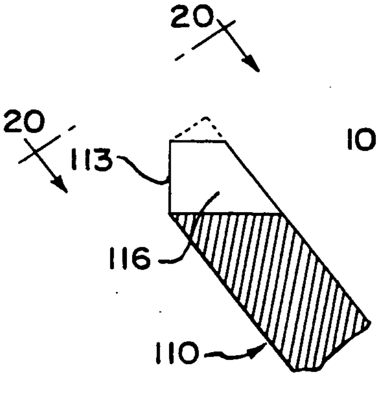


FIG. 22A

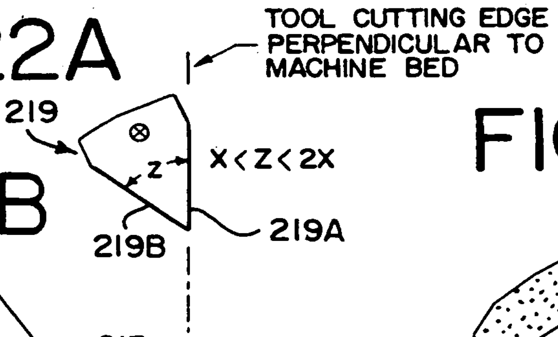


FIG. 22B

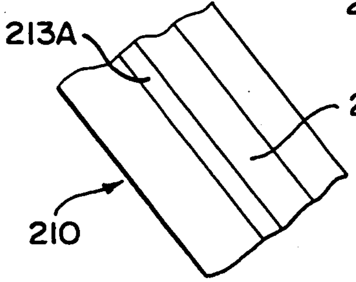
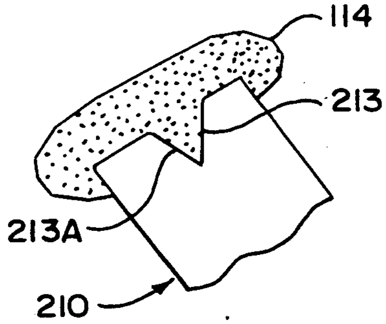


FIG. 22C



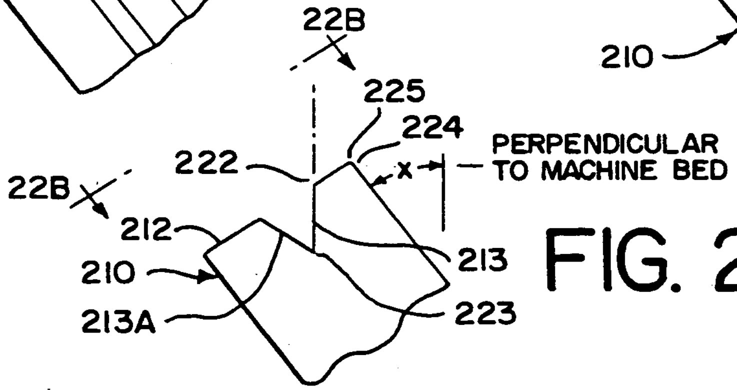


FIG. 22

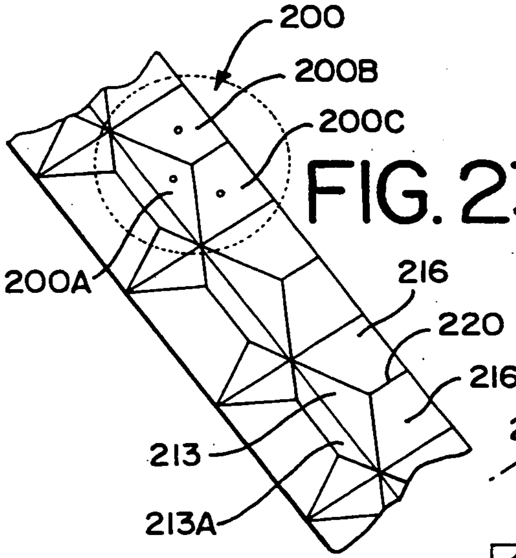
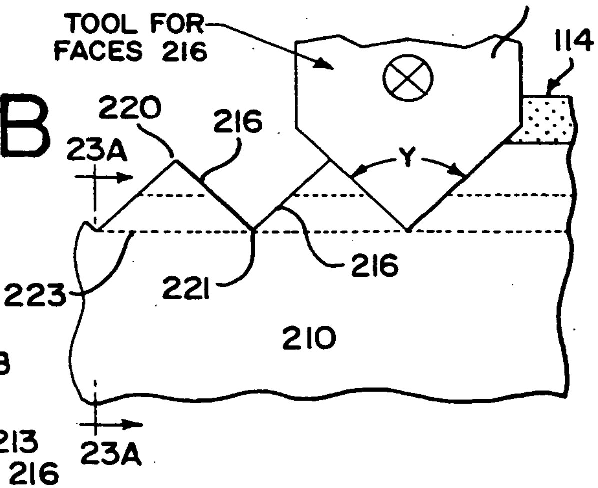


FIG. 23B

FIG. 23



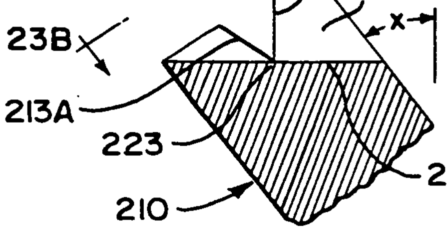


FIG. 23A

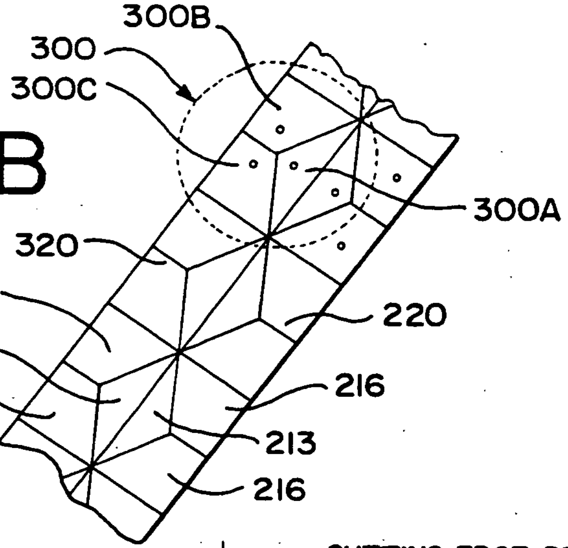


FIG. 25B

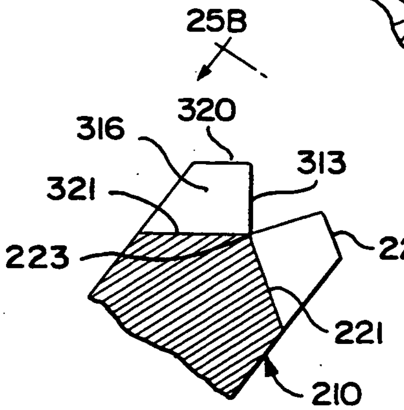


FIG. 25A

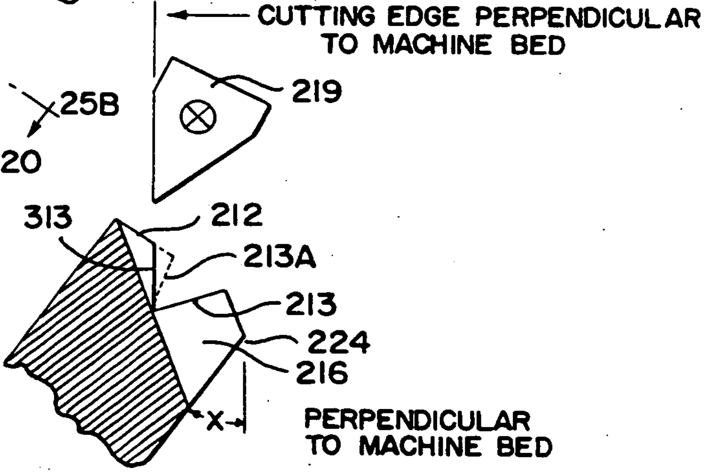


FIG. 24

FIG. 25

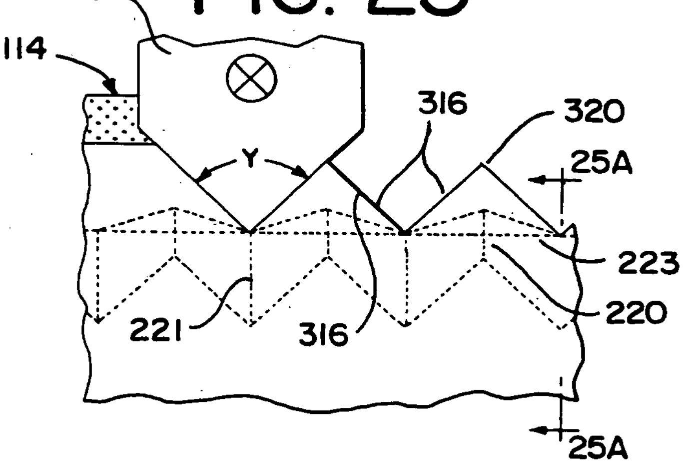


FIG. 26

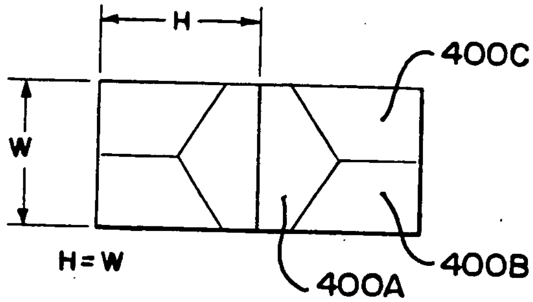


FIG. 27B

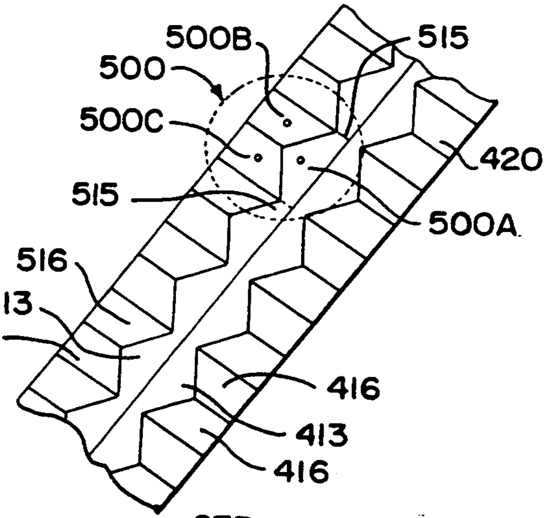
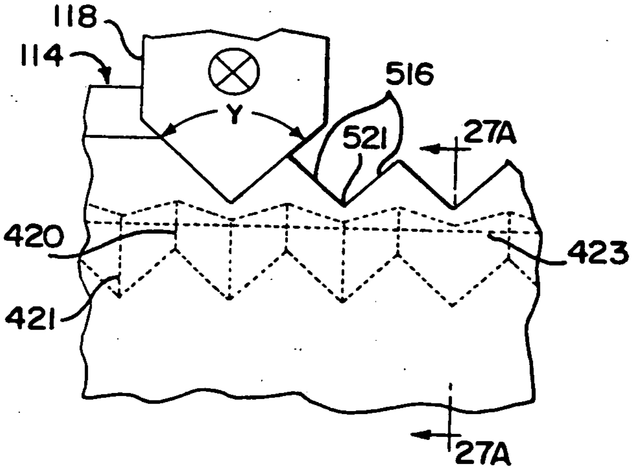


FIG. 27



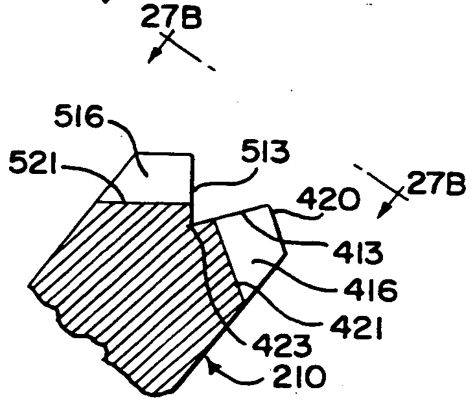


FIG. 27A

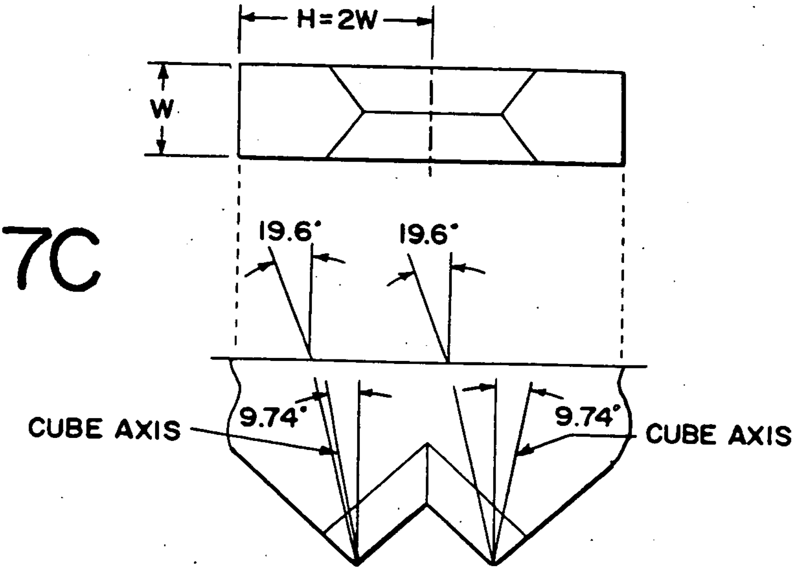
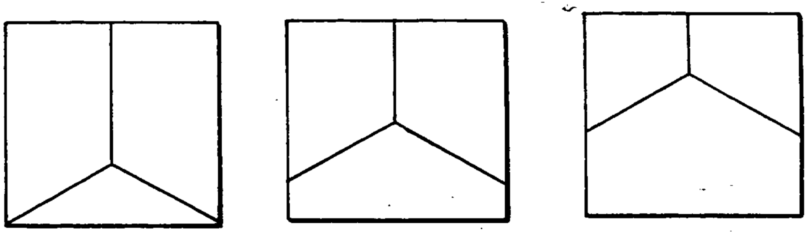


FIG. 27C

FIG. 28

APEX DECENTRATION

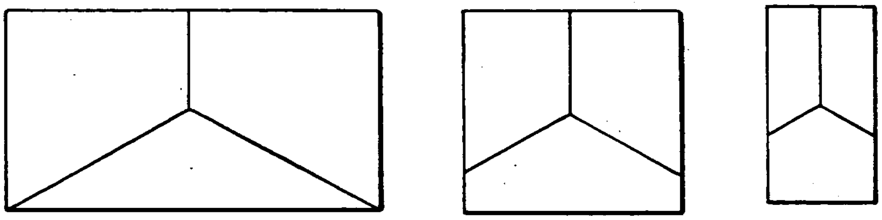


TOWARDS FACE, 58% ACTIVE

CENTERED, 100% ACTIVE

TOWARD EDGE, 58% ACTIVE

BOUNDARY PROPORTIONS

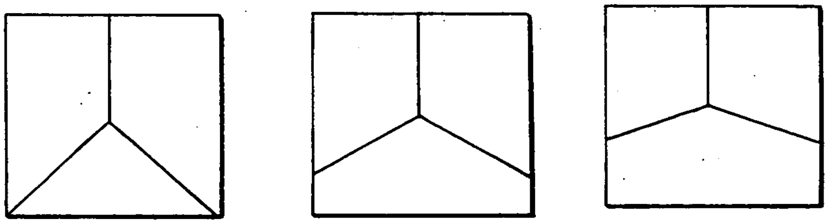


1.73:1

SQUARE

1:2

AXIS CANT



CANT = -9.74°

UNCANTED

CANT = + 15°

FIG. 29A

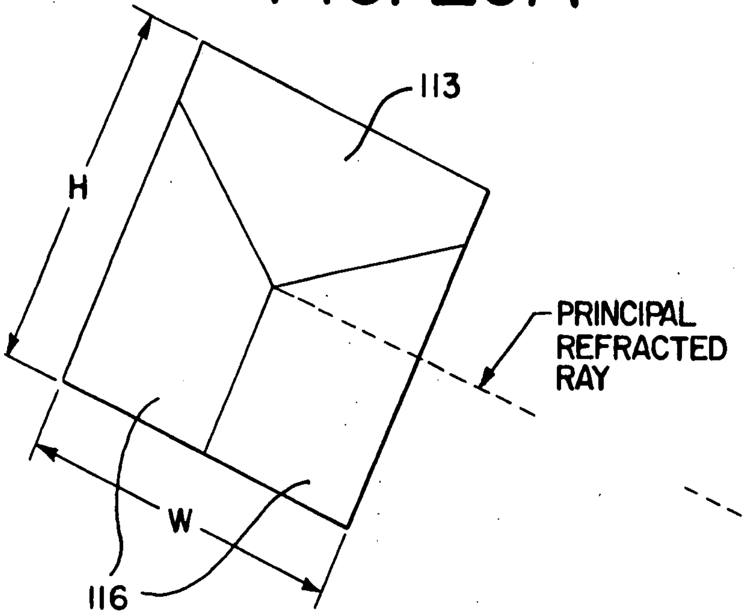


FIG. 29

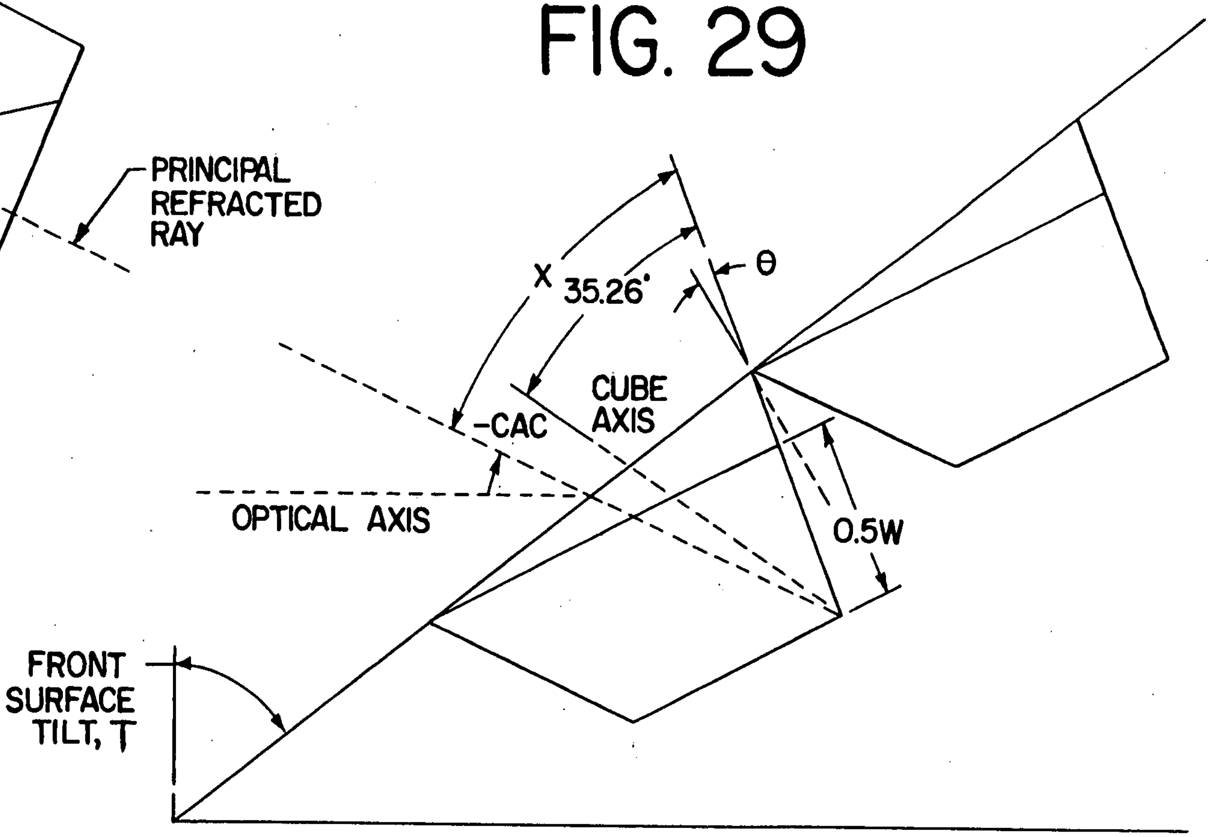


FIG. 30

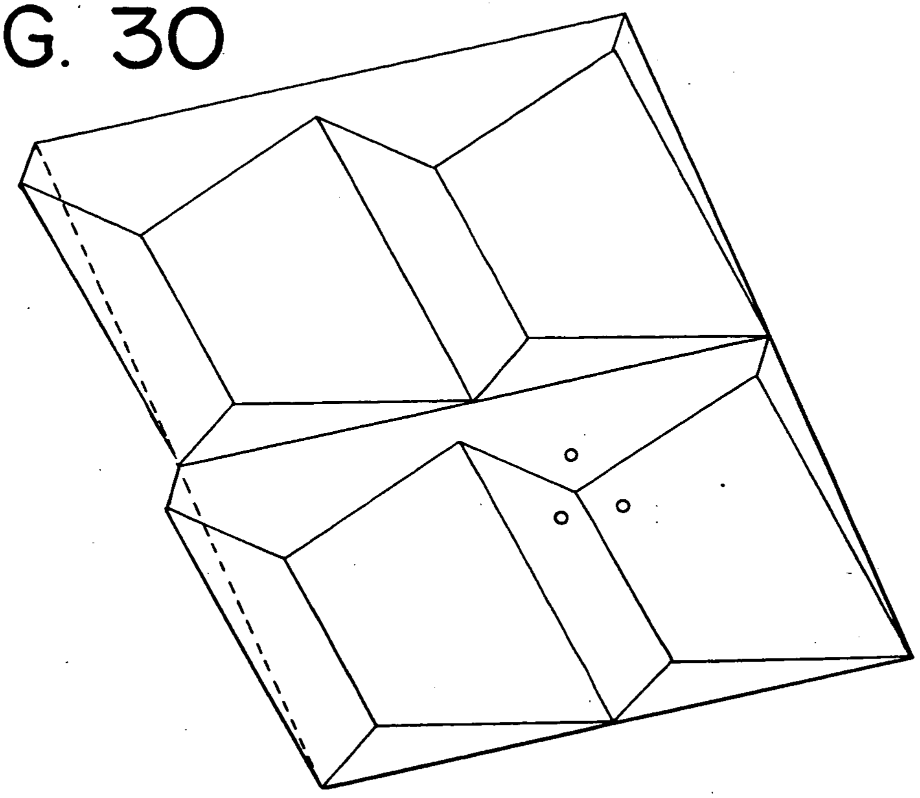


FIG. 31

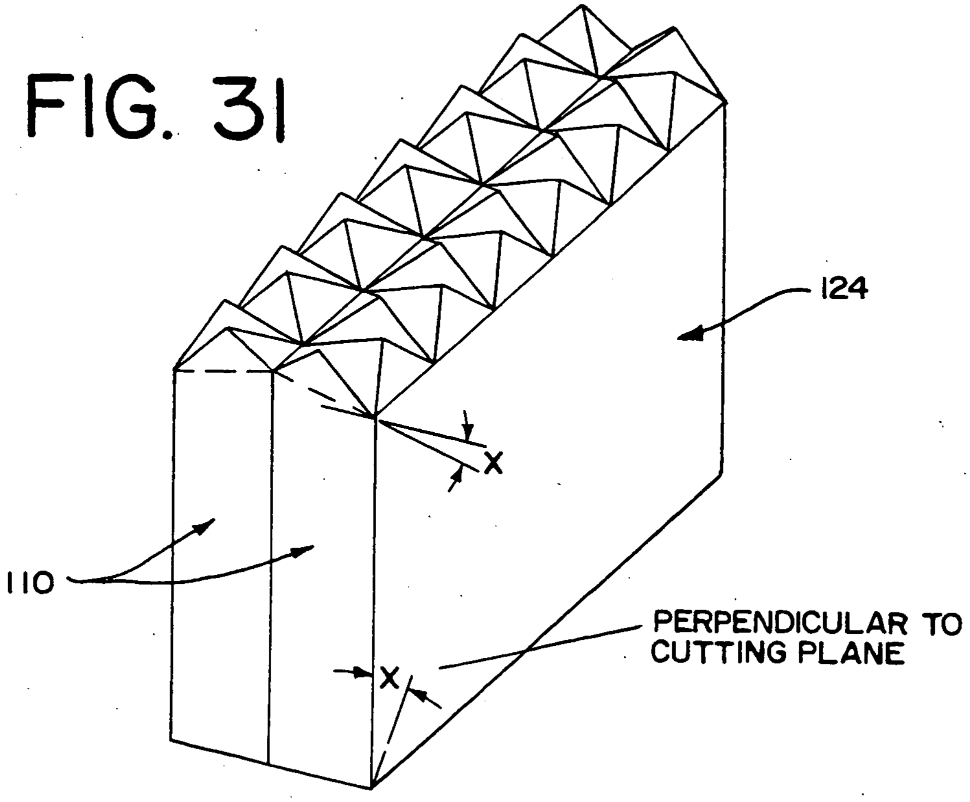


FIG. 32

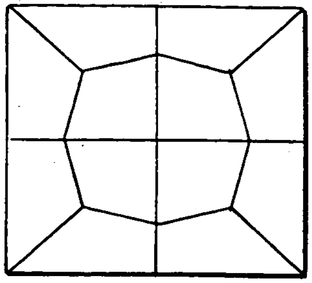


FIG. 33

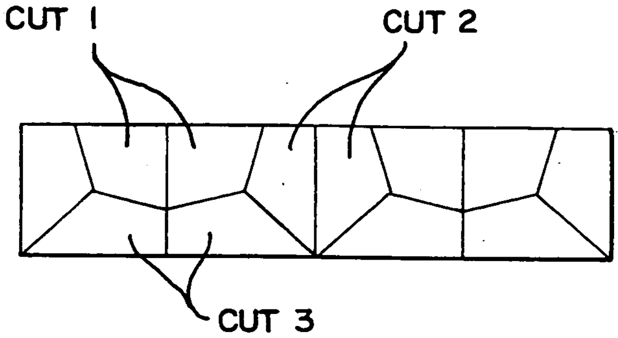


FIG. 34A

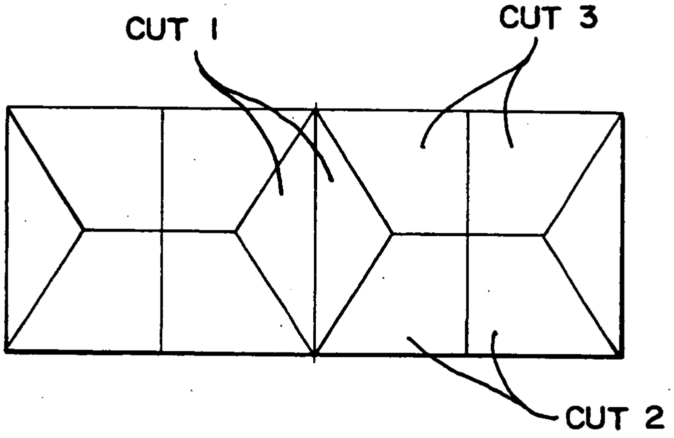


FIG. 34B

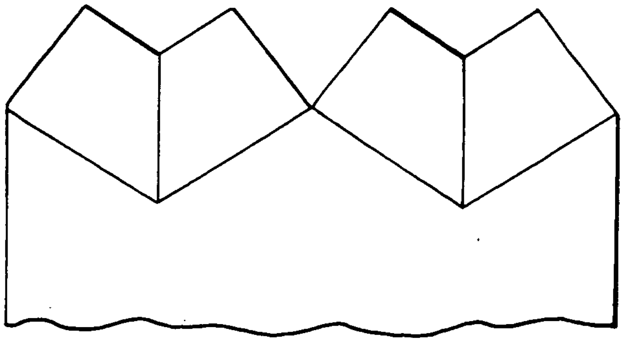


FIG. 35 ARRAY OF PENTA-FACE HEXAGONAL CUBES SHOWING A PLATE HIGHLIGHTED

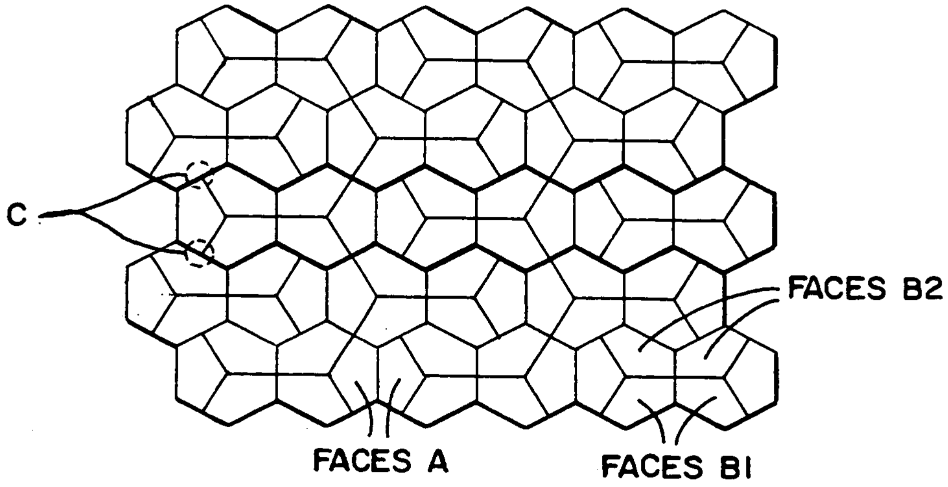


FIG. 36

ARRAY OF PENTAGONAL CUBES WITH +8.7 AXIS TILT AND 89.8 AREA EFFICIENCY

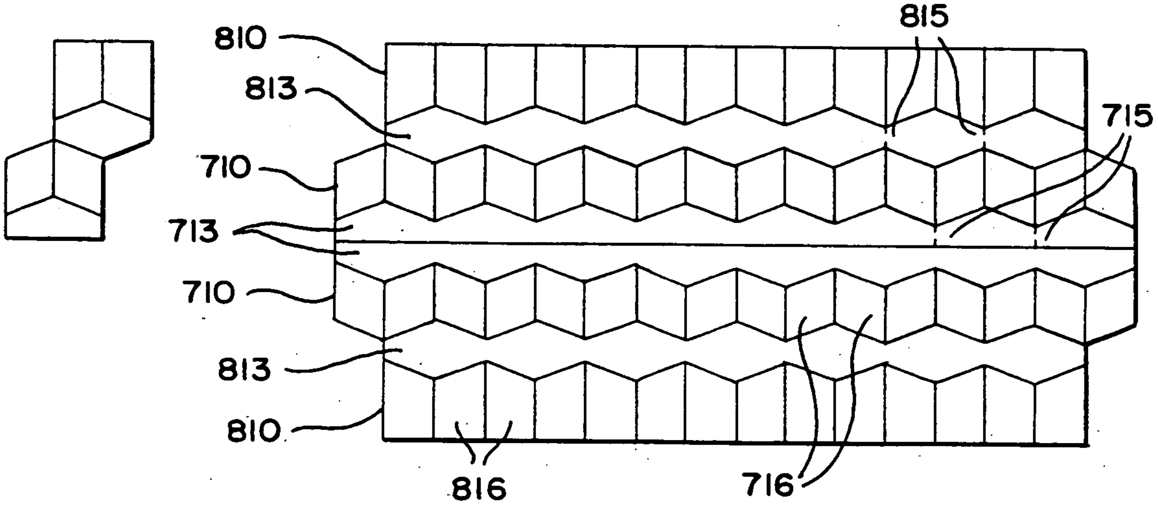
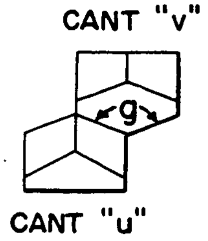


FIG. 36A



$$g = 2\arctan \frac{\sqrt{3}\cos(v-u)}{\cos(v) - \sqrt{2}\sin(v)}$$

FIG. 37

PERFORMANCE OF SIMPLEST HEXBLADE ARRAY (d/t=.7071, s/t=0, NOT PAIRED) FORMED IN MATERIALS OF DIFFERENT REFRACTIVE INDICES

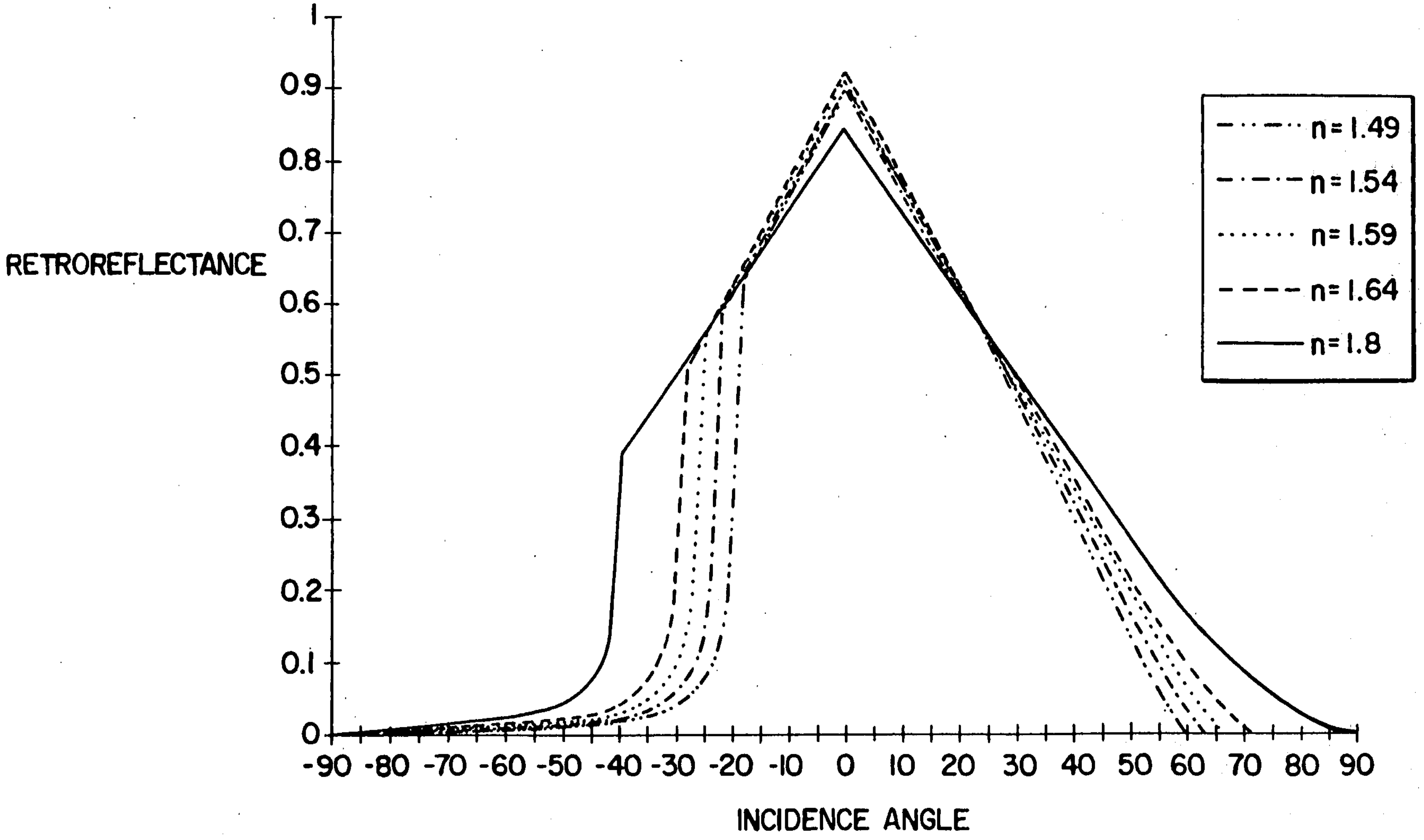


FIG. 38

PERFORMANCE OF HEXBLADE ARRAYS (n=1.49, s/t=0, NOT PAIRED)
OPTIMIZED FOR DIFFERENT INCIDENCE ANGLES

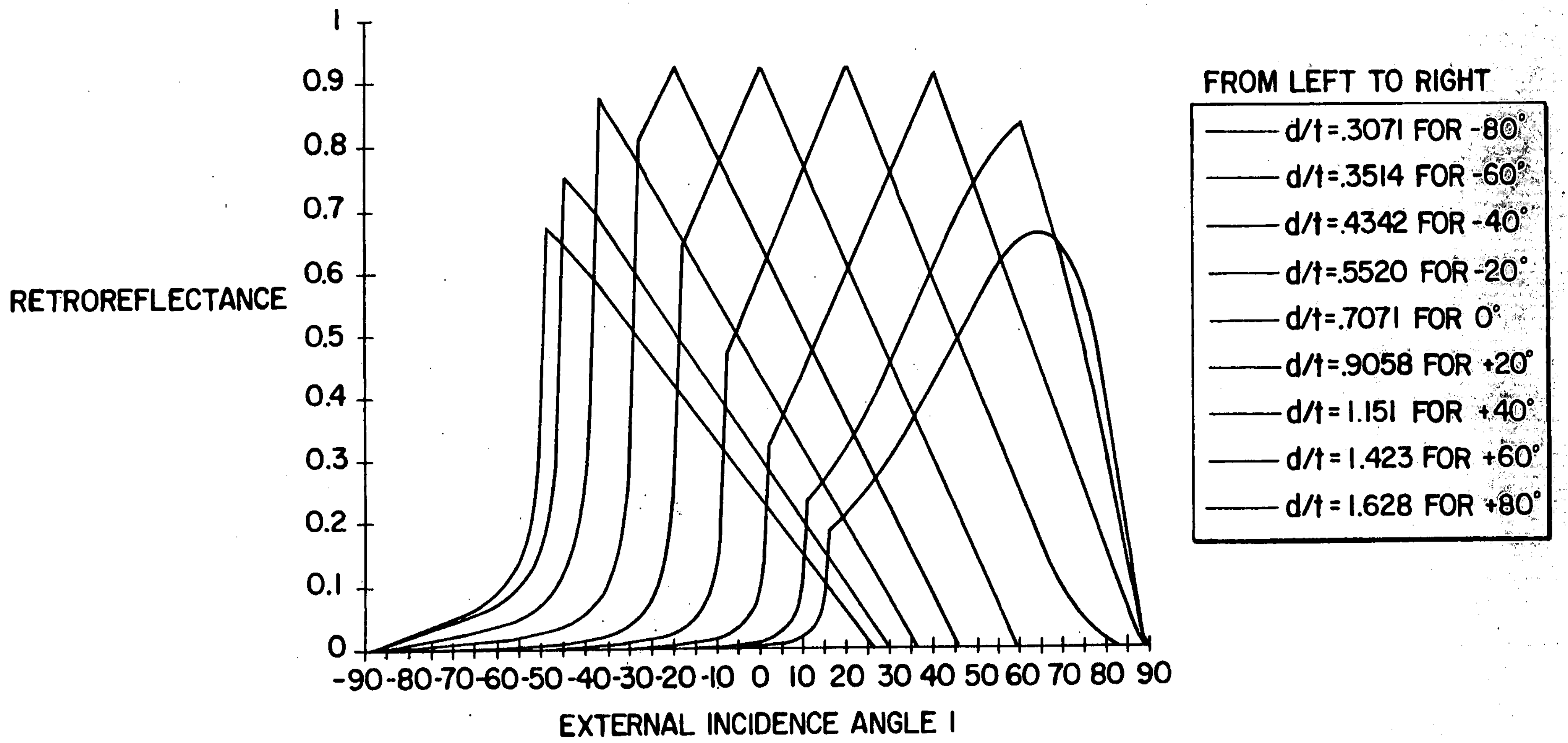


FIG. 39

PERFORMANCE OF HEXBLADE ARRAYS (n=1.49, s/t=0, NOT PAIRED)
OPTIMIZED FOR DIFFERENT INCIDENCE ANGLES

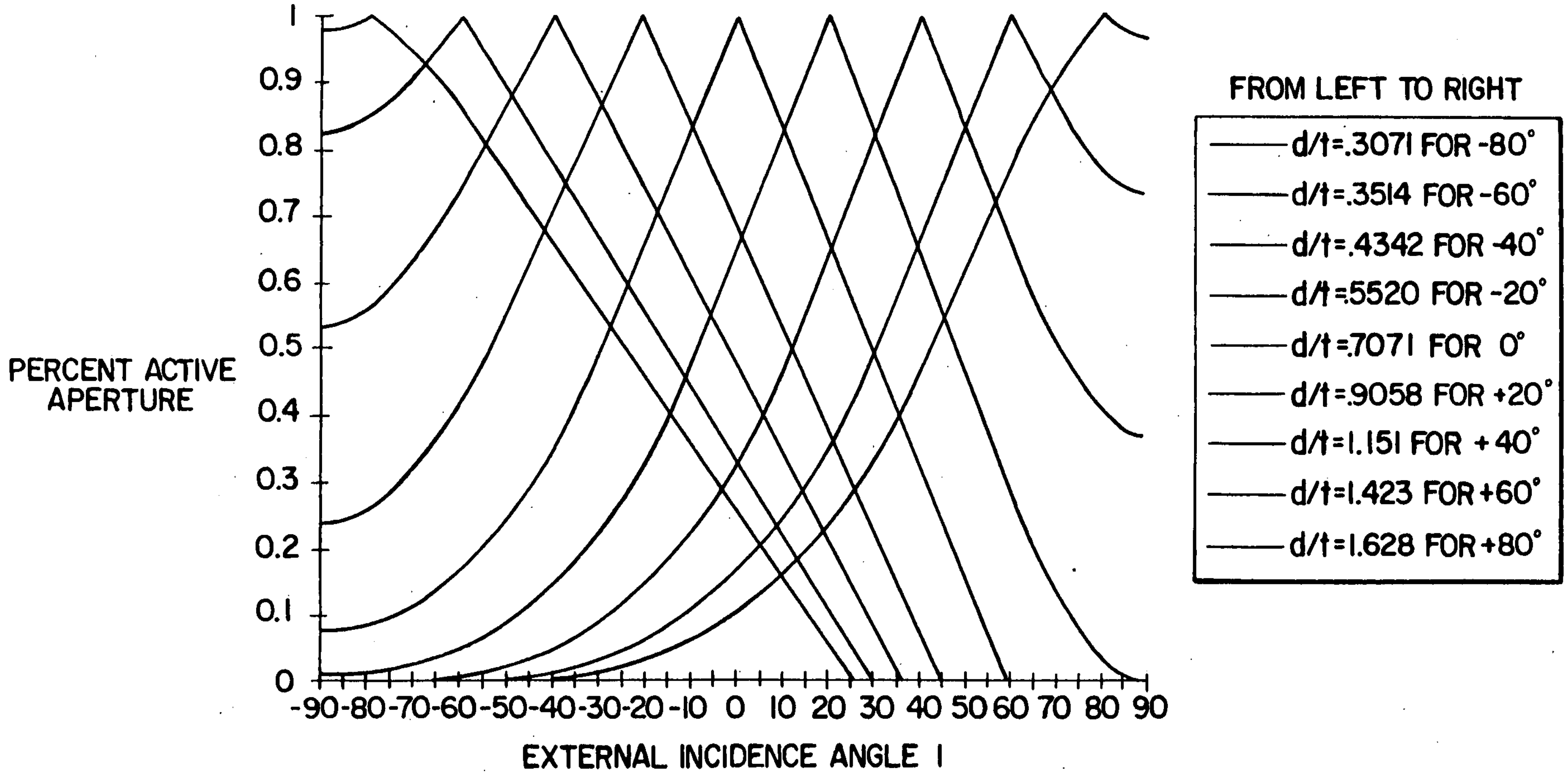


FIG. 40

RECTANGLE AND HEXAGON MICROCUBES OF EXAMPLE I (REFRACTIVE INDEX = 1.59)

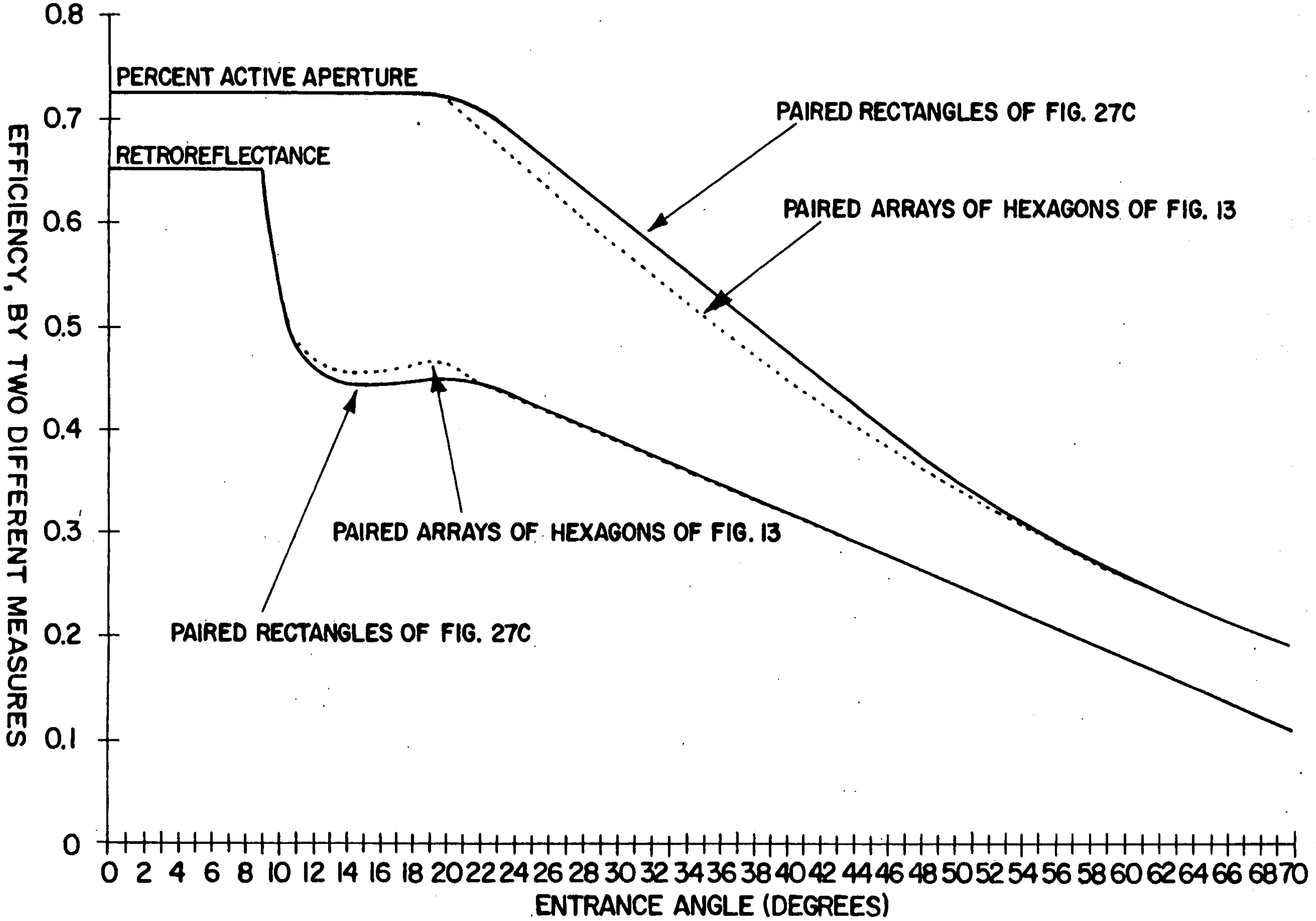


FIG. 41

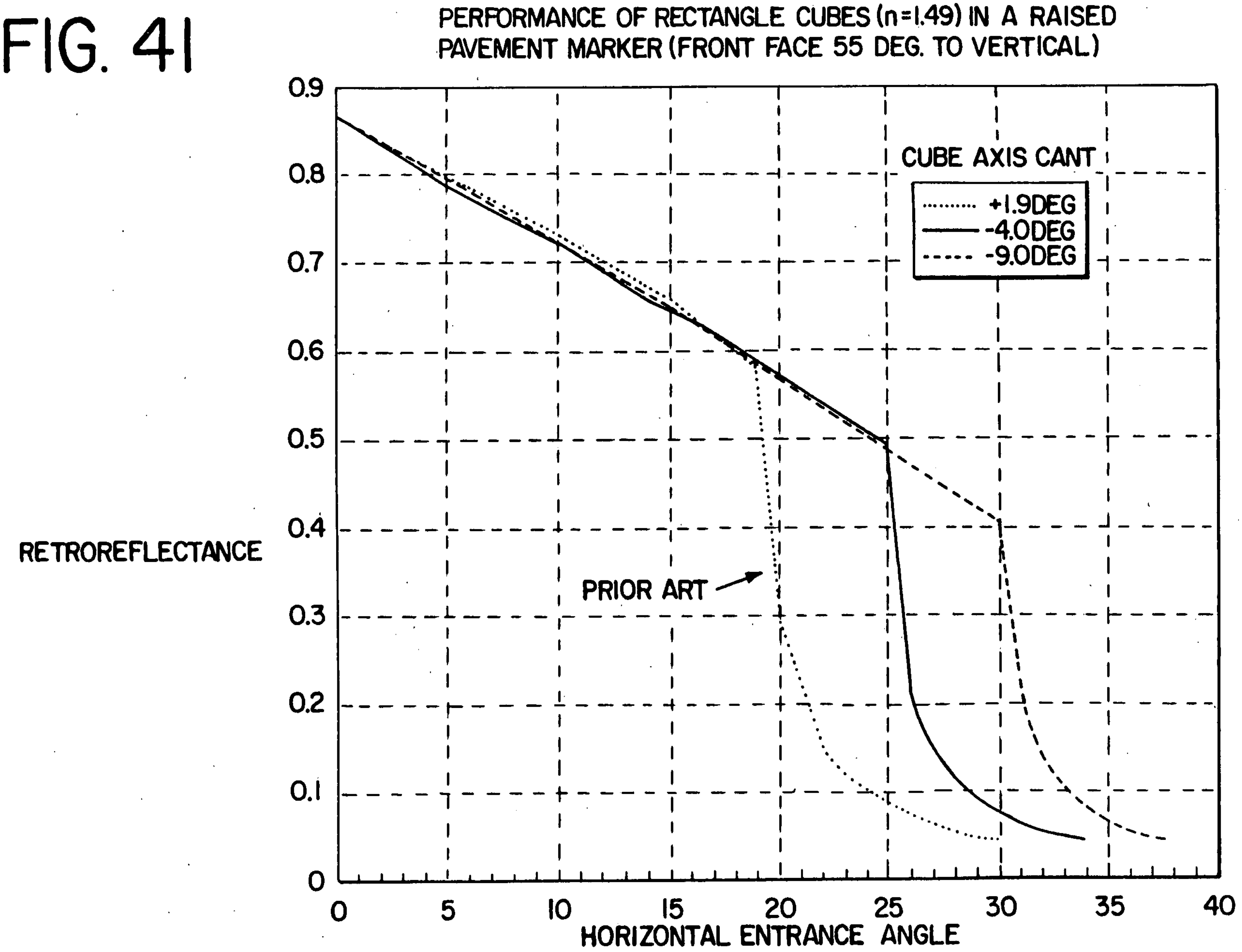

PERFORMANCE OF RECTANGLE CUBES (n=1.49) IN A RAISED PAVEMENT MARKER (FRONT FACE 55 DEG. TO VERTICAL)
CUBE AXIS CANT
+1.9DEG
-4.0DEG
-9.0DEG
PRIOR ART
RETROREFLECTANCE
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
0
5
10
15
20
25
30
35
40
HORIZONTAL ENTRANCE ANGLE

FIG. 42A

RETROREFLECTANCE VERSUS ENTRANCE ANGLE FOR PAIRED ARRAYS O

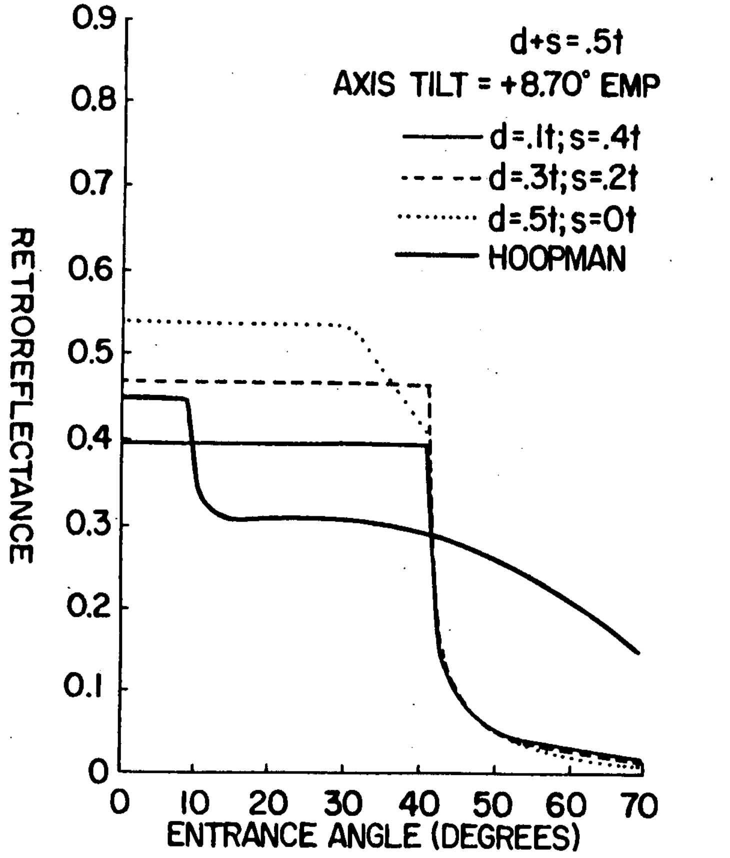


FIG. 42B

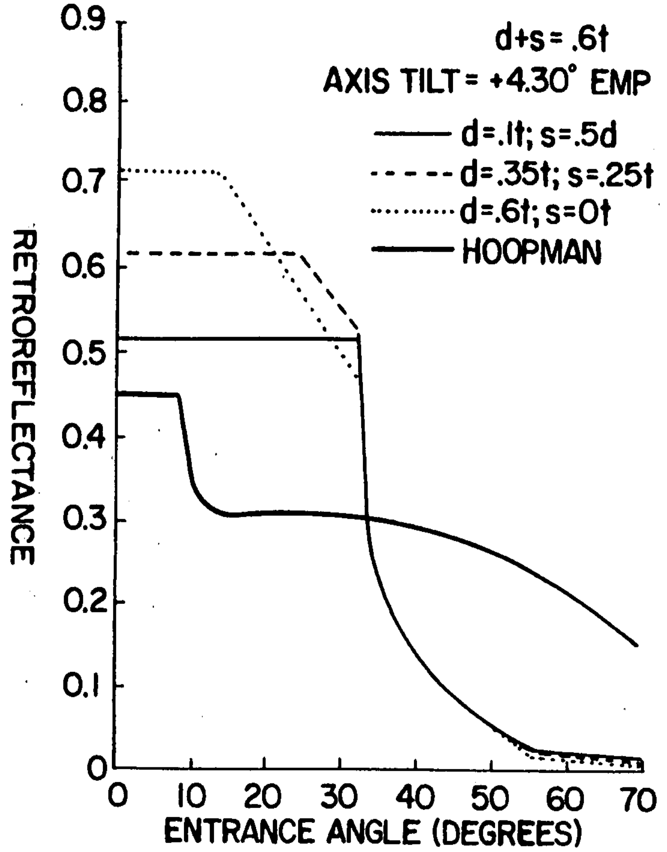


FIG. 42C

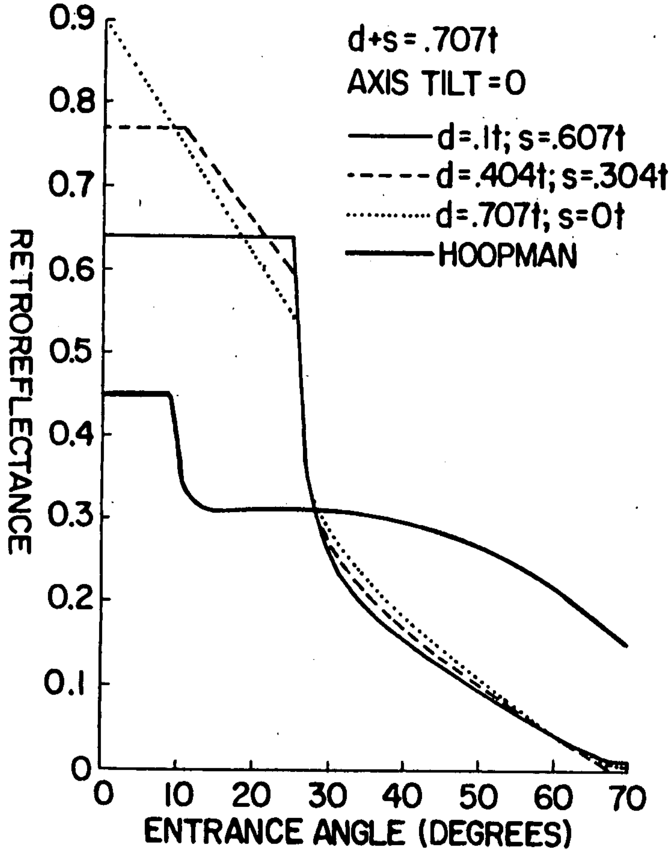


FIG. 42D

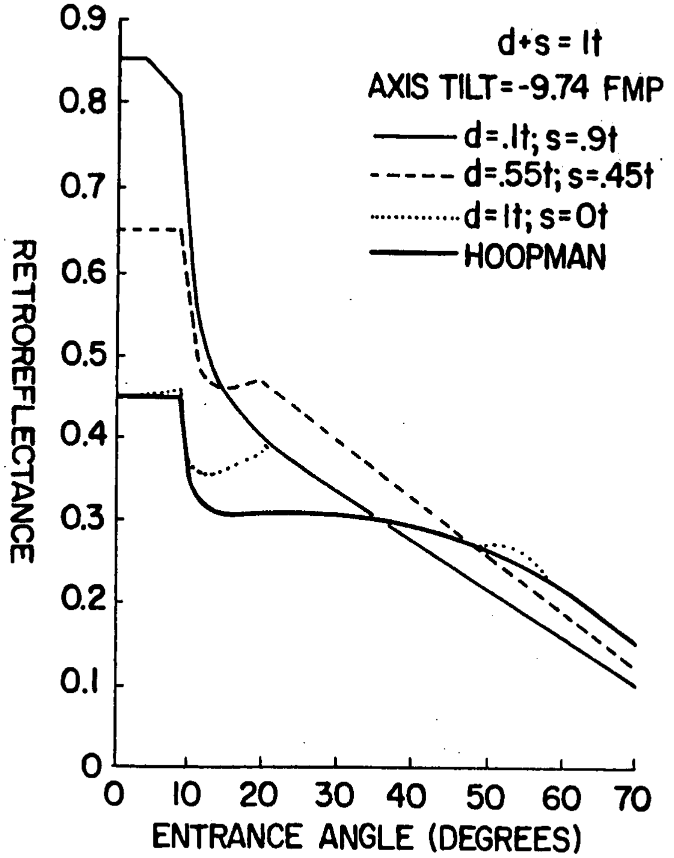
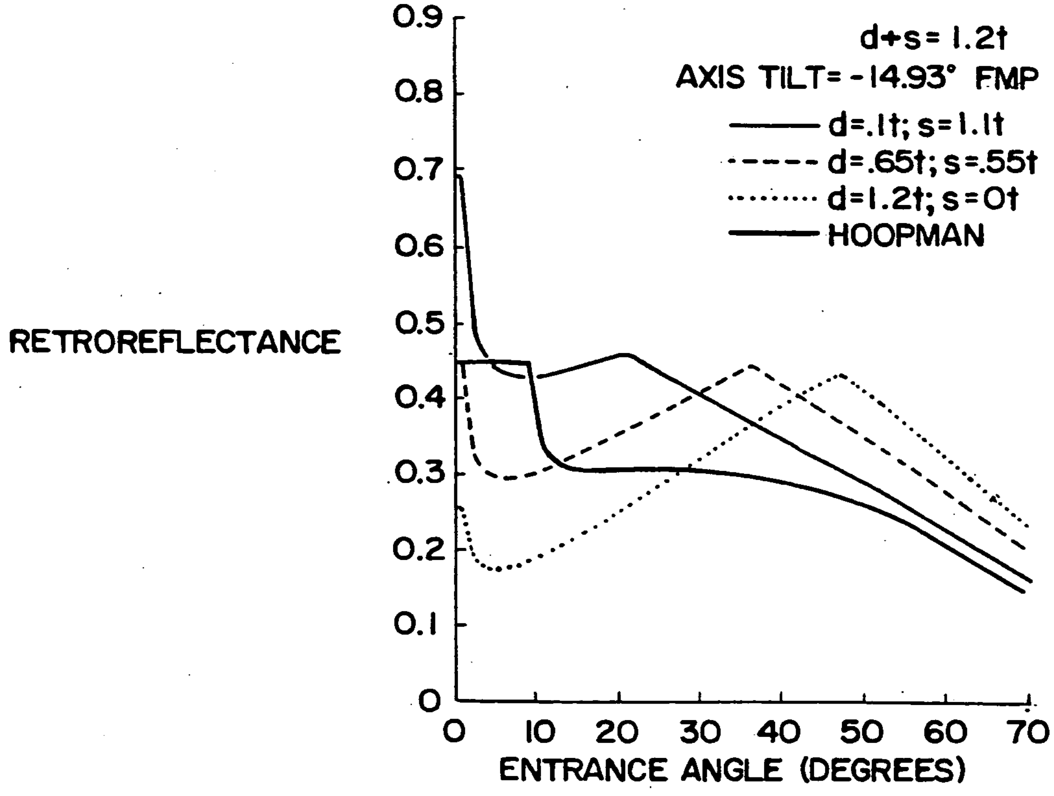


FIG. 42E



RETROREFLECTANCE
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
d+s= 1.2t
AXIS TILT= -14.93° FMP
d=.1t; s=1.1t
d=.65t; s=.55t
d=1.2t; s=0t
HOOPMAN
0
10
20
30
40
50
60
70
ENTRANCE ANGLE (DEGREES)

FIG. 43

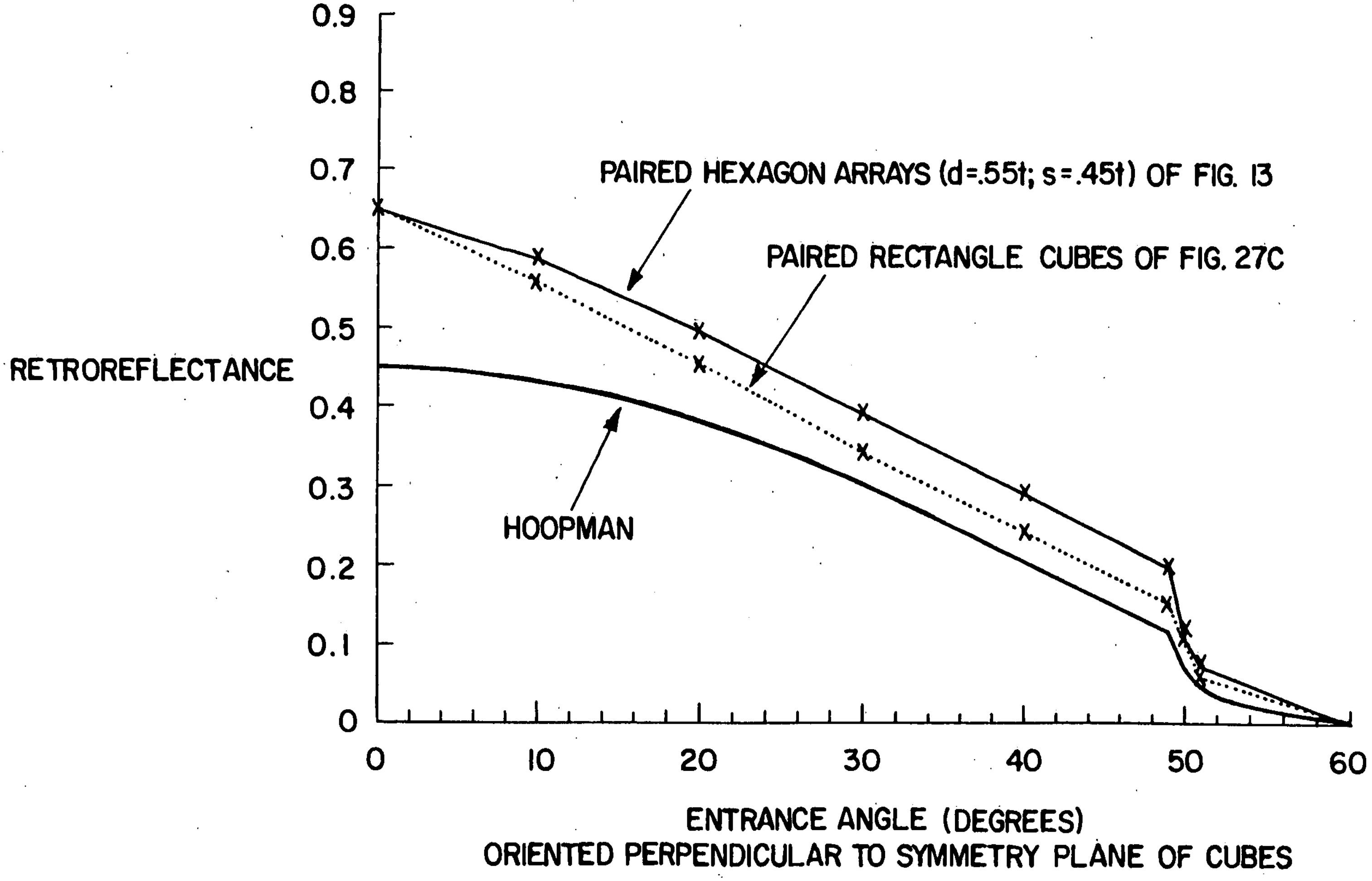

PAIRED HEXAGON ARRAYS (d=.55t; s=.45t) OF FIG. 13
PAIRED RECTANGLE CUBES OF FIG. 27C
HOOPMAN
RETROREFLECTANCE
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
0
10
20
30
40
50
60
ENTRANCE ANGLE (DEGREES)
ORIENTED PERPENDICULAR TO SYMMETRY PLANE OF CUBES

FIG. 44

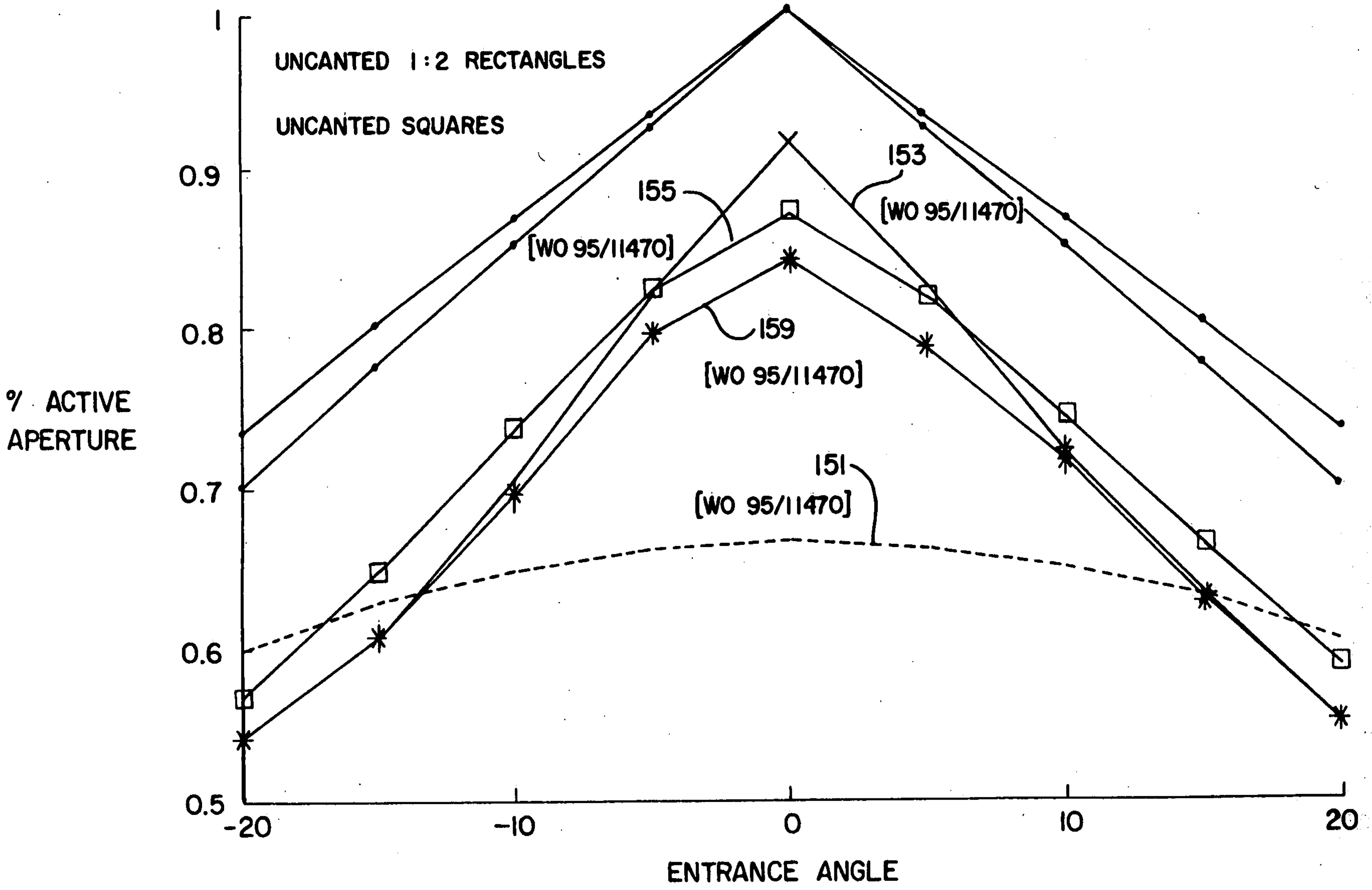

UNCANTED 1:2 RECTANGLES
UNCANTED SQUARES
153
[WO 95/11470]
155
[WO 95/11470]
159
[WO 95/11470]
151
[WO 95/11470]
[WO 95/11470]
% ACTIVE APERTURE
1
0.9
0.8
0.7
0.6
0.5
-20
-10
0
10
20
ENTRANCE ANGLE

FIG. 45

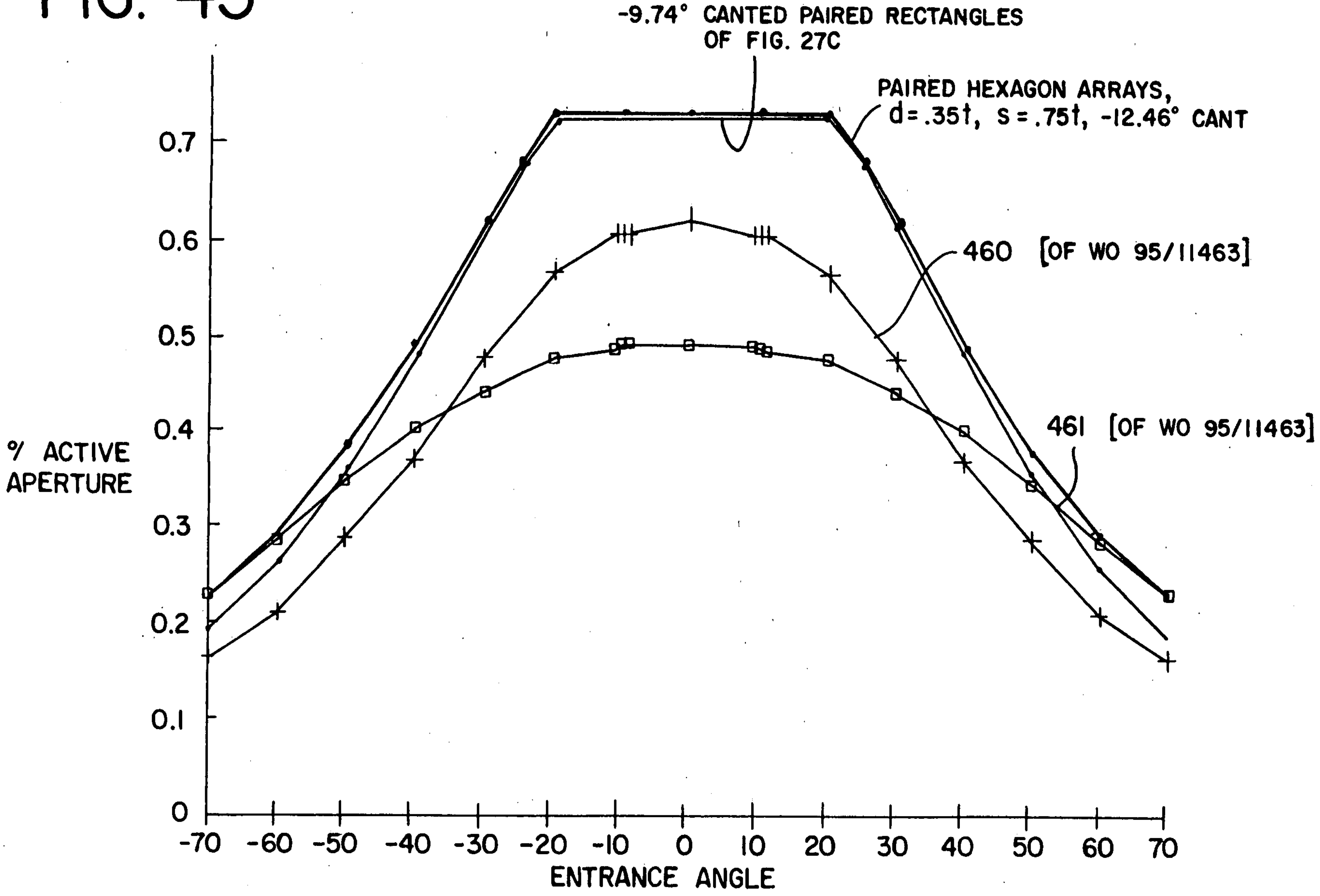

-9.74° CANTED PAIRED RECTANGLES
OF FIG. 27C
PAIRED HEXAGON ARRAYS,
d=.35t, s=.75t, -12.46° CANT
460 [OF WO 95/11463]
461 [OF WO 95/11463]
% ACTIVE
APERTURE
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
-70
-60
-50
-40
-30
-20
-10
0
10
20
30
40
50
60
70
ENTRANCE ANGLE

FIG.46a

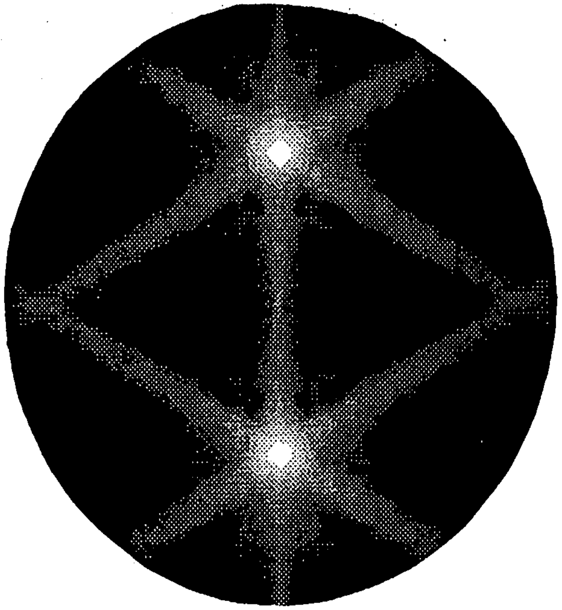


FIG.46b

FIG.46c